

ATTACHMENT 20

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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

CISCO SYSTEMS, INC.,)
)
Plaintiff,)
) Case No.
vs.) 5:14-cv-05344-BLF (PSG)
)
ARISTA NETWORKS, INC.,)
)
Defendant.)
_____)

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VIDEOTAPED DEPOSITION OF KIRK LOUGHEED
Palo Alto, California
Friday, November 20, 2015
Volume I

Reported by:
CARLA SOARES
CSR No. 5908
Job No. 2187110
Pages 1 - 189

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VIDEOTAPED DEPOSITION OF KIRK LOUGHEED,
Volume I, taken on behalf of Defendant, at
650 Page Mill Road, Palo Alto, California, beginning
at 9:19 a.m., and ending at 6:15 p.m., on Friday,
November 20, 2015, before CARLA SOARES, Certified
Shorthand Reporter No. 5908.

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2
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13 ALSO PRESENT: Sean Grant, Video Operator
14 --oo--
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1	A That's correct.	11:06:23	1	that software.	11:11:38
2	Q Would there be any way to know whether you		2	[REDACTED]	[REDACTED]
3	were logged in or not?			[REDACTED]	
4	A Yes.			[REDACTED]	
5	Q What was that?	11:06:35		[REDACTED]	[REDACTED]
6	A There was a command "information about			[REDACTED]	
7	job" that would tell you.			[REDACTED]	
8	Q What was that command?			[REDACTED]	
9	A "Information about job."			[REDACTED]	
10	Q Oh, that was the name of the command?	11:06:56		[REDACTED]	[REDACTED]
11	A Yes.			[REDACTED]	
12	Q Okay. Did you ever refer to there being			[REDACTED]	
13	different modes in TOPS-20?			[REDACTED]	
14	A Could you clarify what you mean by "mode"?			[REDACTED]	
15	Q Well, I guess, first let me ask you just	11:07:40		[REDACTED]	
16	if you ever used that term. Did you ever use the			[REDACTED]	
17	term "modes" in referring to TOPS-20 functionality?			[REDACTED]	
18	A There were many programs that ran on			[REDACTED]	
19	TOPS-20 that had a concept of mode.			[REDACTED]	
20	Q Can you give me an example?	11:08:09		[REDACTED]	[REDACTED]
21	A There was an editor that -- there was a			[REDACTED]	
22	program called EMax for editing that had different			[REDACTED]	
23	modes depending on what programming language you			[REDACTED]	
24	were editing.			[REDACTED]	
25	Q Do you know if EXEC included a parser?	11:09:17		[REDACTED]	11:14:49
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1	A Could you explain to me what you mean by	11:09:26	1	[REDACTED]	[REDACTED]
2	"parser"?		2	[REDACTED]	
3	Q Do you know what a parser is?			[REDACTED]	
4	A I know in a generic sense what a parser			[REDACTED]	
5	is.	11:09:45		[REDACTED]	[REDACTED]
6	Q What's a parser in your -- based on your			[REDACTED]	
7	understanding?			[REDACTED]	[REDACTED]
8	A A parser is something that takes a string			[REDACTED]	
9	of text and divides it up into a sequence of tokens,			[REDACTED]	
10	and then takes some action based on those sequence	11:10:09		[REDACTED]	[REDACTED]
11	of tokens.			[REDACTED]	
12	Q Based upon that understanding, do you know			[REDACTED]	
13	whether EXEC had a parser?			[REDACTED]	
14	A Yes.			[REDACTED]	
15	Q It did?	11:10:25		[REDACTED]	
16	A It did.			[REDACTED]	
17	Q How do you know that it had a parser?			[REDACTED]	
18	A Because it had the behavior that I			[REDACTED]	
19	described.			[REDACTED]	
20	Q Had you ever seen the EXEC source code?	11:11:03	19	Q Are you familiar with the syntax of	
21	A Yes.		20	TOPS-20 commands?	11:17:00
22	Q And had you seen the parser code of EXEC?		21	A In a -- yes.	
23	A I had seen parts of it.		22	Q Can you explain what it is?	
24	Q How did you come to see that code?		23	A There are many commands. I do not	
25	A It was -- Stanford had a source license to	11:11:33	24	remember all of them.	
			25	Q Was there a general format for TOPS-20	11:17:37

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1 A Correct.	11:28:56	1 Q And would this software -- let's say the	11:33:54
2 Q What was that software that Mr. Yeager		2 terminal server part of it at least, was that	
3 gave to you?		3 running on the -- for example, the DECSYSTEM-20	
4 A It was software that had router		4 computers?	
5 functionality as well as terminal server	11:29:22	5 A No.	11:34:09
6 functionality.		6 Q What was it running on?	
7 Q What had that software been developed for,		7 A It was running on a SUN processor card	
8 to your knowledge?		8 where -- well, a SUN processor card.	
9 A I believe it was developed to build --		9 Q The SUN processor card was not a -- itself	
10 help construct, build larger Ethernet networks.	11:30:11	10 a Sun computer, known as a Sun computer yet?	11:34:52
11 Q Do you know why Mr. Yeager gave you a copy		11 A It was not known -- it was -- could you	
12 of that?		12 rephrase the question?	
13 A There was a -- no. I wasn't in his -- I		13 Q Sure.	
14 wasn't in his head. I don't know why he decided to		14 Well, SUN -- SUN is -- you're referring to	
15 give me a copy.	11:30:57	15 Sun Microsystems?	11:35:14
16 Q Tell me how that came about. I mean, did		16 A No.	
17 he just come in and give you some software out of		17 Q What does -- what's the SUN processor card	
18 the blue?		18 then?	
19 A My memory is not precise, but I believe I		19 A Stanford University network.	
20 sent him some email asking if I could get a copy of	11:31:20	20 Q Okay. And did that -- do you understand	11:35:24
21 the software.		21 that that SUN became the Sun of Sun Microsystems?	
22 Q And why did you do that?		22 A That is my understanding.	
23 A I was interested in making changes to that		23 Q Had Sun Microsystems come into existence	
24 software.		24 at this time?	
25 Q What had been your exposure to that	11:31:45	25 A I don't recall the dates.	11:35:53
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1 software prior to receiving a copy of it from	11:31:52	1 Q Okay. So you weren't responsible for the	11:35:54
2 Mr. Yeager?		2 terminal server software as part of your duties at	
3 A The software that I was interested in was		3 Stanford, were you?	
4 the terminal server software, which...		4 A I was not responsible for the terminal	
5 Q And why did you know about it?	11:32:18	5 server software as part of my official duties.	11:36:27
6 A Stanford had a number of terminal servers		6 Q Okay. So you requested the software from	
7 on its network, and we used them.		7 Mr. Yeager out of interest; is that fair?	
8 Q Can you tell me what you -- what is a		8 A Yes.	
9 terminal server?		9 Q And do you know approximately when you	
10 A It is a device for concentrating character	11:32:47	10 made that request to Mr. Yeager for the software?	11:36:44
11 mode terminals onto a network, and using a network		11 A To the best of my recollection, it was	
12 protocol to exchange characters back and forth		12 early 1985. It could have been late 1984, though.	
13 between the terminal server and the networked		13 Q Do you know who wrote the software that	
14 computer at the other end.		14 Mr. Yeager provided to you?	
15 Q Did the software that Mr. Yeager provided	11:33:17	15 A I do not know -- I do not know who wrote	11:37:43
16 to you, did it have a name at the time?		16 the software.	
17 A Not that I recall.		17 Q Do you know anyone who contributed to that	
18 Q And was that software actually in use at		18 software?	
19 the time that you received a copy of it?		19 A I believe Mr. Yeager was one of the people	
20 A That was my understanding.	11:33:40	20 that contributed to that software.	11:37:58
21 Q That it was in use?		21 Q Do you know anyone else who contributed to	
22 A Yes.		22 it?	
23 Q Where was it in use?		23 A Not with any certainty.	
24 A In terminal servers on the Stanford		24 Q Who is Benji Levy?	
25 network.	11:33:51	25 A He was an undergraduate at Stanford.	11:38:29

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1	Q While you were there?	11:38:34	1	Stanford?	11:44:15
2	A Yes.		2	A I don't remember if I provided the source	
3	Q Did you ever work with Mr. Levy?		3	back. I certainly provided copies of the improved	
4	A Yes.		4	software.	
5	Q In what capacity?	11:38:48	5	Q You mean perhaps in binary form?	11:44:34
6	A I hired him.		6	A In binary form.	
7	Q At Cisco?		7	Q Why didn't you -- sorry. Strike that.	
8	A Yes. At Stanford.		8	The software you received from Mr. Yeager	
9	Q Oh. In what role did you hire him? Or		9	was in source?	
10	what position did you hire him for, to be clear?	11:39:26	10	A Correct.	11:44:44
11	A We referred to it as a cable -- a cable		11	Q Why didn't you provide the source back to	
12	troll. Hardware technician would probably be the		12	Stanford?	
13	more modern description of that.		13	MR. NEUKOM: Objection. Misstates prior	
14	Q Did he work at all on modifying the		14	testimony.	
15	software that Mr. Yeager provided to you?	11:40:21	15	THE WITNESS: I don't recall if I provided	11:45:02
16	A Not to my direct knowledge. Software was		16	the source code back to anybody at Stanford. I was	
17	not part of his job duties for me.		17	Stanford.	
18	Q And to be clear, did Mr. Almquist work on		18	BY MR. FERRALL:	
19	modifying any of that software that Mr. Yeager		19	Q Did you implement the improved terminal	
20	provided to you?	11:40:55	20	server software at Stanford?	11:45:22
21	A He may have.		21	A Yes.	
22	Q To your knowledge, did he?		22	Q So where did the source for that improved	
23	A I have no direct knowledge of that.		23	terminal server software reside when you implemented	
24	Q Were you asked to make any changes to the		24	it?	
25	software that Mr. Yeager provided to you?	11:41:13	25	A On a UNIX system that was -- that belonged	11:45:46
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1	A No. That was not part of my duties.	11:41:16	1	to Stanford.	11:45:55
2	Q Did you talk to anyone about what you were		2	Q And that's what you had done your	
3	going to do with that software before doing it?		3	modifications on?	
4	A I may have.		4	A Yep.	
5	Q Who did you talk to?	11:41:38	5	Q Did you make any modifications to the	11:46:12
6	A I don't remember if I talked to anybody		6	router functionality of the Yeager software?	
7	before I started on that.		7	A My initial interest was only in the --	
8	Q And what prompted you to start modifying		8	only in the terminal server software.	
9	or changing that software?		9	Q So is that -- I'm sorry. Is that a no,	
10	A I wanted to learn a new technology, and I	11:42:39	10	you didn't make any modifications to the router	11:46:43
11	wanted to see if I could improve the behavior of the		11	functionality?	
12	terminal server.		12	A I removed it.	
13	Q What was your intention of what you would		13	Q You removed it from your copy or -- what	
14	do with the -- with your modifications to the		14	do you mean, you removed it?	
15	software?	11:43:04	15	A That is correct. I removed it from my	11:46:58
16	A That I would be able to improve its		16	copy.	
17	performance and its manageability.		17	Q So again, going back to your testimony	
18	Q Sticking with the terminal server		18	earlier this morning, when you referred to extending	
19	functionality, did you improve its performance?		19	and making improvements on software you received	
20	A Yes, I did.	11:43:44	20	from Mr. Yeager, was that only as to the terminal	11:47:49
21	Q And did you provide your modifications		21	server functionality?	
22	back to Mr. Yeager?		22	A That was my initial intent.	
23	A I don't recall if I -- I don't recall if I		23	Q Okay. My question was asking about what	
24	did or not.		24	you did as opposed to your intent.	
25	Q Did you provide those to anyone at	11:44:13	25	Did you only extend and/or make	11:48:13

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1	improvements to the terminal server part of the	11:48:18	1	A No.	11:54:43
2	software Mr. Yeager provided you?		2	Q Why did you do it?	
3	MR. NEUKOM: Objection to form. Vague,		3	A I had figured out terminal servers and	
4	compound.		4	PUP. The Internet protocol was the -- was the new	
5	THE WITNESS: At a later date I did write	11:48:39	5	developing technology, and I wanted to learn more	11:55:07
6	router support and put it into the software.		6	about how IP worked.	
7	BY MR. FERRALL:		7	Q What resources did you look at to learn	
8	Q Okay. First, what's router support?		8	about how IP worked?	
9	A Being able to receive a packet on one		9	A I looked at RFCs.	
10	interface and figure out which of -- which other	11:49:28	10	Q Anything else?	11:55:46
11	interface to send it out upon, rewriting the header		11	A Not that I -- not that I recall.	
12	of the packet as appropriate.		12	Q At some point did you tell anyone else at	
13	Q What was the -- strike that.		13	Stanford that you were writing this IP support?	
14	Was there router support functionality in		14	A I told my boss, Steve Hanson, and I also	
15	the software Mr. Yeager provided you?	11:50:00	15	discussed it with Len Bosack.	11:56:28
16	A Yes.		16	Q Tell me about your discussion with	
17	Q And what did you do to change that?		17	Mr. Hanson. What did you say to him?	
18	A I removed his support because I wasn't		18	A "This is what I'm doing in my spare time."	
19	interested in it at the time, and later on -- later		19	Q And what did he say?	
20	on my interest changed.	11:50:45	20	A "Fine."	11:56:54
21	Q Okay. I understand that.		21	Q And what did you tell Mr. Bosack?	
22	So what happened later on when your		22	A That I was -- I don't remember the details	
23	interest -- your interest then moved to the router		23	of what I told him. We had technical discussions.	
24	functionality? What did you do?		24	Q What were the technical discussions about?	
25	A I wrote support for IP, and I took a few	11:51:10	25	A How elements of the protocol suite worked,	11:57:42
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1	pieces of the PUP support that Mr. Yeager had there.	11:51:28	1	programming techniques, possibly where the stuff	11:57:53
2	Well, actually, the PUP support actually		2	could be -- what stuff would be useful to Stanford	
3	already existed for the terminal server portion.		3	that would also be interesting for me.	
4	Q So the terminal server portion already had		4	Q At what time did you first have the idea	
5	PUP support for routing?	11:52:08	5	to use this software in your own commercial venture?	11:58:34
6	A For routing and for terminal sessions.		6	MR. NEUKOM: Objection to form.	
7	Q Okay. And did the software from		7	THE WITNESS: I did not come up with that	
8	Mr. Yeager have any routing support for IP?		8	idea.	
9	A Yes.		9	BY MR. FERRALL:	
10	Q And did you use any of that?	11:52:46	10	Q Who did?	11:58:54
11	A No.		11	A I believe it was Len.	
12	Q What did you do with it?		12	Q And when did you first learn of Len	
13	A It was a confusing mess. I threw it out		13	Bosack's idea to use this software that you were	
14	and wrote my own.		14	working on?	
15	Q And when did you write that routing	11:53:03	15	A Sometime in early '86.	11:59:32
16	support for IP?		16	Q Did you ever tell Mr. Hanson about that	
17	A Late '85, I believe.		17	idea to use the software in a commercial venture?	
18	Q You wrote that -- the code -- sorry.		18	A No.	
19	When you wrote that, the code was on this		19	Q Did you tell anyone at Stanford about that	
20	UNIX computer at Stanford; is that right?	11:53:51	20	idea other than Mr. Bosack?	11:59:56
21	A I did my development on a UNIX system at		21	A No.	
22	Stanford.		22	Q Who is Eric Schoen, S-C-H-O-E-N?	
23	Q Did you talk to anyone about your		23	A I don't know.	
24	intentions in writing this IP routing support prior		24	Q Do you know a Frank Gilmurray?	
25	to doing so?	11:54:41	25	A Vaguely.	12:00:25

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1	Q Who do you know there?	12:56:33	1	A They were all on the border gateway	13:00:09
2	A I know Vic White. I know as in I --		2	protocol.	
3	socially I know Vic White and Ken Harrenstien. I've		3	Q Has Cisco ever had any policies about	
4	never heard of Zaw-Sing Su. And Elizabeth Feinler I		4	their employees submitting RFCs to the IETF?	
5	only know by reputation.	12:57:02	5	A I'm not aware of any specific policies.	13:01:02
6	Q Were they -- to your knowledge, were they		6	Q Did the software that you worked on at	
7	all at SRI?		7	Stanford, the routing and terminal server software	
8	A I know that Vic, Ken and Elizabeth were.		8	we talked about, did that include an address	
9	I have no idea -- I've never seen the name Zaw-Sing		9	resolution protocol?	
10	Su before today.	12:57:20	10	MR. NEUKOM: Objection to form. Vague.	13:02:09
11	Q What's SRI International?		11	BY MR. FERRALL:	
12	A It is a primarily government-funded		12	Q I should say an address resolution	
13	research institute.		13	protocol feature.	
14	Q Did you ever have any involvement with		14	MR. NEUKOM: Same objection.	
15	SRI? And when I say "involvement," I mean some	12:57:52	15	THE WITNESS: Yes.	13:02:23
16	official --		16	BY MR. FERRALL:	
17	A No.		17	Q And what were the sources of information	
18	Q -- relationship.		18	for you in order to -- well, strike that.	
19	A No.		19	Did you write software for the address	
20	Q Okay. Let me ask you to look at	12:58:06	20	resolution protocol feature?	13:02:38
21	Exhibit 31.		21	A Yes.	
22	Do you ever recall reviewing an RFC for an		22	Q And what were the sources of information	
23	address resolution protocol?		23	that you used to prepare that address resolution	
24	A I'd actually like to read through this.		24	protocol feature?	
25	Q Well, I'm just asking you the question	12:58:38	25	MR. NEUKOM: Objection to form. Vague,	13:02:58
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1	right now.	12:58:39	1	calls for a conclusion.	13:03:06
2	Mr. Lougheed, you have to understand,		2	THE WITNESS: Documents whose name I do	
3	we've got a lot to cover today, and I need to --		3	not recall.	
4	A And I'm also under oath, and I want to		4	BY MR. FERRALL:	
5	make sure my replies to your answers (sic) are	12:58:47	5	Q Can you describe generally what they were?	13:03:16
6	correct.		6	A They were documents that described a	
7	Q Okay. So I'm asking you -- you can put		7	packet format and described an associated state	
8	the document down, frankly.		8	machine.	
9	Do you ever recall reviewing an RFC for an		9	Q Is the address resolution protocol	
10	address resolution protocol?	12:58:58	10	referred to simply by the acronym ARP?	13:03:59
11	A Yes, I do recall reviewing a document --		11	A There's a general concept of an address	
12	it may have been an RFC -- on address resolution.		12	resolution protocol, and then there's one, possibly	
13	Q Do you know who developed address		13	more, that are -- may be described in various	
14	resolution protocols?		14	documents from the IETF.	
15	A I don't recall.	12:59:20	15	Q When did you first hear -- have you ever	13:04:52
16	Q Did you contribute to that field?		16	heard the address resolution protocol abbreviated as	
17	A No.		17	ARP?	
18	Q All right. Do you know David Plummer?		18	A Yes.	
19	A I have heard the name before but I don't		19	Q When did you first hear that abbreviation?	
20	know the person.	12:59:31	20	A I don't recall -- I don't recall the	13:05:17
21	Q How many IETF RFCs have you authored in		21	precise time.	
22	whole or in part?		22	Q Was it while you were still at Stanford?	
23	A Two, maybe three.		23	A It certainly could have been.	
24	Q What were the subject or subjects of those		24	Q Did you develop any features for the	
25	RFCs?	13:00:07	25	address resolution protocol yourself?	13:05:52

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1	MR. NEUKOM: Objection. Vague.	13:05:56	1	BY MR. FERRALL:	13:11:01
2	THE WITNESS: I do not understand your		2	Q At some point did you or colleagues of	
3	question. What do you mean, develop features for		3	yours at Stanford refer to a gateway project?	
4	the address resolution protocol?		4	A There was -- I don't recall anything that	
5	BY MR. FERRALL:	13:06:12	5	was a gateway project.	13:11:20
6	Q Fair enough. Let me ask it a different		6	Q Did you ever refer to your -- the software	
7	way.		7	that you were working on, the routing and the	
8	Did you contribute to any IETF RFC		8	terminal server software, as software for a gateway?	
9	relating to the address resolution protocol?		9	MR. NEUKOM: Objection to form.	
10	MR. NEUKOM: Objection. Asked and	13:06:27	10	THE WITNESS: The devices that the	13:11:50
11	answered.		11	software ran on were either terminal servers or	
12	THE WITNESS: No.		12	gateways.	
13	BY MR. FERRALL:		13	BY MR. FERRALL:	
14	Q Did you develop features at -- while at		14	Q What does a -- what's a gateway?	
15	Cisco that relate to ARP, if you don't mind me using	13:06:44	15	A At Stanford at that time, it was what has	13:12:08
16	the acronym?		16	since been called a router. It's an obsolete name	
17	A I don't understand the question.		17	for a router.	
18	Q Who is Glenn Truitt?		18	Q Do you know who came up with the term	
19	A He's a -- at my time at Stanford, he was a		19	"gateway"?	
20	graduate student.	13:08:37	20	A No, I don't.	13:12:23
21	Q Did you work with him while at Stanford?		21	Q When did you first hear the term	
22	A Briefly.		22	"gateway"?	
23	Q In what capacity?		23	A I don't recall.	
24	A I recollect that he may have written a		24	Q At Stanford sometime?	
25	user guide to the software at the time, but that's	13:09:21	25	A Yes.	13:12:39
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1	about all that I remember of my interactions with	13:09:29	1	Q Were there devices that functioned as	13:12:47
2	him.		2	gateways in operation at Stanford before you left?	
3	Q Did you oversee his writing of a user		3	A Yes.	
4	guide to the software?		4	Q When, to your knowledge, was such a	
5	A No.	13:09:52	5	gateway device first operational at Stanford?	13:13:09
6	Q Who did, do you know?		6	A I don't know.	
7	A I have no idea.		7	Q When did you first hear about a functional	
8	Q Why -- to your knowledge, do you know why		8	gateway at Stanford?	
9	he wrote a user guide to the software?		9	A I don't recall.	
10	MR. NEUKOM: Objection. Foundation.	13:10:07	10	Q Before you got the software from	13:13:30
11	THE WITNESS: No, I don't -- I don't		11	Mr. Yeager?	
12	recall why he was doing that.		12	A Quite possibly.	
13	BY MR. FERRALL:		13	Q Does the term TIP, T-I-P, mean anything to	
14	Q And can you tell me, at what state of		14	you from your time at Stanford?	
15	development of the software did he write a user		15	A Yes.	13:13:57
16	guide for?		16	Q What's that?	
17	A I don't recall.		17	A It's an acronym.	
18	Q At any time before you left Stanford, did		18	Q What does it mean?	
19	you have a name for the software that you were		19	A Terminal interface processor.	
20	working on that you had received from Mr. Yeager	13:10:43	20	Q Did any of your work while you were	13:14:12
21	originally?		21	employed at Stanford have to do with a TIP?	
22	MR. NEUKOM: Objection. Misstates prior		22	A That was not part of my duties.	
23	testimony.		23	Q My question was a little bit different.	
24	THE WITNESS: There was no formal name for		24	A Okay.	
25	the software.	13:10:58	25	Q My question was, while you were employed	13:14:31

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1	Q Since you say that, let me ask you, what	13:37:12		1 those still saved somewhere?
2	was the purpose of this correspondence that's			2 A I had a copy in my Cisco directory.
3	Exhibit 33? Do you recall?			3 Q Do you know, do you still have a copy of
4	A The Cisco marketing people were			4 those files somewhere?
5	constructing a timeline for what Cisco was doing	13:37:31		5 A Yes.
6	starting in 1984, and I was giving them some advice			6 Q Where?
7	as to what I thought was a more -- more accurate			7 A I believe they're still on my Cisco
8	view.			8 [REDACTED]
9	Q By the way, you're Cisco employee number			[REDACTED]
10	four; is that right?	13:38:00		[REDACTED]
11	A Close enough.			[REDACTED]
12	Q Who's number three, do you know?			[REDACTED]
13	A So when we handed out badge numbers, the			[REDACTED]
14	secretary got badge 1, Sandy got badge 2, Len got			[REDACTED]
15	badge 3, and I had badge 4.	13:38:27		[REDACTED]
16	MR. FERRALL: Okay. That explains it.			[REDACTED]
17	Let's mark this as the next exhibit.			[REDACTED]
18	(Exhibit 34 was marked for identification			[REDACTED]
19	and is attached hereto.)			[REDACTED]
20	BY MR. FERRALL:	13:38:51		[REDACTED]
21	Q Marked as Exhibit 34 is I guess a two-page			[REDACTED]
22	set of emails bearing control numbers			[REDACTED]
23	CSI-CLI-01317865 to 66.			[REDACTED]
24	My question for you -- and you're welcome			[REDACTED]
25	to read this one, of course -- is -- I would like	13:39:12		[REDACTED]
		Page 94		
1	you to explain what it is that you attached to this	13:39:19		[REDACTED]
2	email.			[REDACTED]
3	A Okay. I've read it.			[REDACTED]
4	I'm sorry. What was your question again?			[REDACTED]
5	Q Well, so in the last email in this thread,	13:40:14		[REDACTED]
6	you write, "Here's the original tarball, gzipped.			[REDACTED]
7	Kirk."			[REDACTED]
8	Right?			[REDACTED]
9	A Right.			[REDACTED]
10	Q First of all, can you explain what you	13:40:32		[REDACTED]
11	mean by "tarball"?			[REDACTED]
12	A There is a UNIX program called TAR, tape			[REDACTED]
13	archive, that is used to gather a group of files			[REDACTED]
14	together. It's a way of moving files from one UNIX			[REDACTED]
15	system to another UNIX system. And a tarball is an	13:40:56		[REDACTED]
16	informal description of the file that results.			[REDACTED]
17	Q Okay. So when you said "the original			[REDACTED]
18	tarball, gzipped," what do you mean by that?			[REDACTED]
19	A I don't recall what was on my mind to use			[REDACTED]
20	the adjective "original."	13:41:26		[REDACTED]
21	Q Do you know what these files were that you			[REDACTED]
22	attached to this email?			[REDACTED]
23	A I believe they are files that comprise the			[REDACTED]
24	software that I was working on at Stanford.			[REDACTED]
25	Q And I guess as of 2010, at least, you had	13:42:10		[REDACTED] :46:46

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1 [REDACTED]
 2 [REDACTED]
 3 [REDACTED]
 4 [REDACTED]
 5 [REDACTED]
 6 [REDACTED]
 7 [REDACTED]
 8 [REDACTED]
 9 [REDACTED]
 10 [REDACTED]
 11 [REDACTED]
 12 [REDACTED]
 13 [REDACTED]
 14 [REDACTED]
 15 [REDACTED]
 16 [REDACTED]
 17 [REDACTED]
 18 [REDACTED]
 19 [REDACTED]
 20 [REDACTED]
 21 [REDACTED]
 22 [REDACTED]
 23 [REDACTED]
 24 [REDACTED]
 25 [REDACTED]

15 MR. FERRALL: I didn't realize that. 13:51:39
 16 Thank you for clarifying that.
 17 Actually, we can take a quick break.
 18 MR. NEUKOM: Okay.
 19 THE VIDEO OPERATOR: Going off the record,
 20 the time is 1:52 p.m. 13:51:57
 21 (Recess, 1:52 p.m. - 2:03 p.m.)
 22 THE VIDEO OPERATOR: Back on the record.
 23 The time is 2:03 p.m.
 24 MR. FERRALL: Let's mark this as the next
 25 exhibit. 14:03:07

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1 (Exhibit 35 was marked for identification 16:48:10
 2 and is attached hereto.)
 3 BY MR. FERRALL:
 4 Q We've marked as Exhibit 35 a set of emails
 5 bearing control numbers CSI-CLI-01134849 to 850. 14:03:19
 6 This appears to be some email exchange
 7 between you and Joe Hielscher.
 8 Did I say that right?
 9 A I have no idea if you said it correctly.
 10 Q Do you know who he is? 14:03:47
 11 A I think he's a communications person
 12 working at Cisco.
 13 Q Okay. My question here is just about your
 14 email at the top of the first page. You explain in
 15 the first sentence that Releases 8, 9 and 10 can be 14:04:22
 16 found on a volume if you have a UNIX account. And
 17 then you write, "Releases 5, 6 and 7 are likely
 18 lost, since I believe their archives were deleted by
 19 someone."
 20 Do you -- do you have a recollection about 14:04:43
 21 whether releases of IOS are -- were lost at some
 22 point?
 23 A Yes.
 24 Q Were they? Were certain releases lost?
 25 A Yes. The source code to a number of early 14:05:11

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1	reveal -- basically mostly status commands and ones	14:27:53	1	bracket prompt?	14:33:02
2	for handling connections over the network to other		2	A Router name, close angle bracket.	
3	hosts, sort of a subset of the -- of the terminal		3	Q Right.	
4	server commands.		4	A Yes, I chose that.	
5	Q And you said you chose the term "EXEC,"	14:28:26	5	Q Okay. How did you come to choose that?	14:33:09
6	that's E-X-E-C; is that right?		6	A Well, there were -- when you have multiple	
7	A Yes.		7	devices on a network, one of the first things you	
8	Q You chose that term, yes?		8	want to know if you're typing at something is to	
9	A Yes.		9	what you are typing at. So that -- sort of the most	
10	Q How did you come up with that term?	14:28:39	10	aesthetic choice was the -- was the name of the	14:33:51
11	A Well, I had a number of possible ways of		11	device.	
12	describing it. I could have used "shell" after		12	And the angle bracket was a nice visual	
13	the -- modeling it along the UNIX way of -- UNIX		13	way of terminating -- you know, here's where your	
14	equivalent.		14	type-in begins. Here's where the prompt ends,	
15	From -- I decided EXEC in sort of -- you	14:29:15	15	here's where the type-in begins.	14:34:19
16	know, inspired by the TOPS-20 command processor.		16	Q Had you ever seen the angle bracket used	
17	You know, calling it the command processor would		17	as a prompt in any other system?	
18	have been another possibility.		18	A I wasn't aware of any generally available	
19	There was a number of possibilities that I		19	host -- general purpose timesharing that actually	
20	could have called it, what I could have called that	14:29:38	20	that was the default, that was the prompt.	14:34:56
21	particular part of the software, and I ended up		21	Q I'm not sure what you mean by that.	
22	choosing EXEC.		22	But had you ever seen any system that used	
23	Q Now, were you responsible for determining		23	a close angle bracket as a prompt?	
24	the prompt symbol on the interface?		24	A No. TOPS-20 used an "at" sign and UNIX	
25	I'm sorry. Let me be clear.	14:30:26	25	used a percent sign.	14:35:19
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1	I'm talking about on the interface line,	14:30:28	1	Q And you're not aware of any use of a hash	14:35:22
2	there are symbols that precede the input point, such		2	sign as a prompt?	
3	as a hash sign, for example, right?		3	A Not to my recollection.	
4	A So for -- I was responsible for choosing		4	Q You were familiar with UNIX in the mid	
5	the prompts for the command line interface, for the	14:30:45	5	1980s, right?	14:36:18
6	CLI.		6	A As a user of UNIX.	
7	Q Okay. And tell me what those prompts are,		7	Q And -- by the way, are you familiar with	
8	the various prompts that the Cisco CLI uses.		8	Linux?	
9	A There are many right now. But at the time		9	A Only as a user.	
10	there was the -- the unprivileged EXEC commands, and	14:31:09	10	Q When did you first become familiar with	14:36:38
11	that was the host name of the -- of the router or --		11	Linux?	
12	of the router, followed by a close angle bracket.		12	A With Linux? I think I first heard mention	
13	There was a privileged mode, and it		13	of it in the late '90s.	
14	changed that prompt to a hash mark.		14	Q Did Cisco come up with the nomenclature of	
15	And in the initial implementation of	14:31:55	15	calling a mode "privileged," to your knowledge?	14:38:02
16	configuration mode, there was no prompt.		16	A I don't believe -- I don't believe Cisco	
17	Q Okay. How did you choose the hash prompt		17	came up with that terminology.	
18	for the privileged mode?		18	Q Let me turn to the current set of IOS CLI	
19	A It was visually large and different than		19	commands.	
20	the -- different -- just different than the	14:32:25	20	I don't expect an exact number, but do you	14:38:54
21	unprivileged EXEC prompt.		21	know approximately how many IOS CLI commands there	
22	Q Okay. How did you use the unprivileged		22	are today?	
23	close angle bracket prompt?		23	A I would have to guess. It is a -- it's a	
24	A I don't understand your question.		24	very large number.	
25	Q Did you choose to use the close angle	14:32:59	25	Q Can you just give me a ballpark?	14:39:15

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1	THE VIDEO OPERATOR: Going off the record, 14:58:06	1	document that he's just put in front of you before 15:27:57
2	the time is 2:58 p.m.	2	answering his question.
3	(Recess, 2:58 p.m. - 3:24 p.m.)	3	THE WITNESS: Okay. I'll read it.
4	THE VIDEO OPERATOR: Back on the record.	4	MR. FERRALL: Actually, no, I would like
5	The time is 3:24 p.m. 15:24:02	5	him to answer the question. 15:28:03
6	BY MR. FERRALL:	6	Q Are you telling me you can't tell me
7	Q Mr. Lougheed, when did you first become	7	whether you sent the email?
8	aware of DOS, D-O-S?	8	MR. NEUKOM: It's a totally unfair
9	A I'd say whose DOS?	9	question. The email that he sent would necessarily
10	Q MS-DOS. 15:24:36	10	include everything that follows. 15:28:10
11	A MS-DOS? I probably heard about it when	11	If you want him to tell you whether he
12	IBM announced the IBM PC.	12	remembers this or whether he sent it, let him read
13	Q Do you recall that MS-DOS uses a close	13	the document. Come on, Brian.
14	angle bracket as a prompt?	14	It's a page and a half. We're not talking
15	A Now that you remind me, it does. 15:25:16	15	about him wasting 30 minutes to read a product
16	Q Do you think you might have been inspired	16	manual. It's a page-and-a-half email. The witness
17	by that prompt when you chose the close angle	17	has said he wants to read it, and we're going to let
18	bracket for Cisco's prompt?	18	him read it.
19	A No. I was not a DOS user.	19	THE WITNESS: Okay. I've read it.
20	Q So it's just a coincidence that you and 15:25:34	20	BY MR. FERRALL: 15:29:28
21	DOS came up with the same prompt, to your knowledge?	21	Q Okay. Did you send this email that's
22	MR. NEUKOM: Objection. Asked and	22	dated December 11, 2008, at 10:14 p.m.?
23	answered.	23	A I believe I did.
24	THE WITNESS: I was not a DOS user. I	24	Q Okay. And in the last paragraph of that
25	first -- I was not a DOS user. 15:26:06	25	email, you write, "The percent sign leading a 15:29:41
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1	MR. FERRALL: Let's mark this as the next 15:26:35	1	message indicates that you are looking at an error 15:29:49
2	exhibit.	2	message. An ancient operating system called TOPS-20
3	(Exhibit 38 was marked for identification	3	used such a convention and I adopted it."
4	and is attached hereto.)	4	Do you see that?
5	BY MR. FERRALL: 15:26:37	5	A Yeah, I do see that. 15:29:59
6	Q Exhibit 38 is a set of emails between you	6	Q Why did you adopt a TOPS-20 convention?
7	and Mr. Remaker, among others. It bears control	7	A Of the possibilities that I had, that
8	numbers CSI-ANI-00043306.	8	seemed -- that seemed a reasonable -- to me, it
9	A Okay. I'd like to read this.	9	seemed like a reasonable way of doing things.
10	Q First let me ask you the question so you 15:27:19	10	Q Did you get permission from Digital 15:30:32
11	know what to look for.	11	Equipment Company to use that convention?
12	A I will forget the question by the time I'm	12	MR. NEUKOM: Objection. Calls for a legal
13	done reading this.	13	conclusion and misstates prior testimony.
14	Q Well, Mr. Lougheed, that's not the way it	14	THE WITNESS: No, I did not seek
15	works, actually. I ask the question and you answer 15:27:28	15	permission. 15:30:55
16	it.	16	BY MR. FERRALL:
17	A Okay.	17	Q Have you ever heard of the acronym RIP in
18	Q If you can't answer it, then you tell me.	18	the context of networking?
19	My only question is, did you send the	19	A It typically means routing information
20	email that's at the top of Exhibit 38, the one at 15:27:38	20	protocol. 15:31:18
21	12-11-2008 at 10:14 p.m.?	21	Q You're familiar with that protocol?
22	MR. NEUKOM: Mischaracterizes the document	22	A It's been a while, but yes, I'm familiar
23	on its face.	23	with it.
24	And I know that Mr. Ferrall would like you	24	Q Did you make up the acronym RIP for
25	to feel comfortable to read the page-and-a-half 15:27:54	25	routing information protocol? 15:31:32

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1	A No, I did not make up that acronym.	15:31:37	1	A He worked for IBM. 15:34:52
2	Q Did you make up the term "routing		2	Q What was Mr. Rekhter's contribution to the
3	information protocol"?		3	BGP RFC? The first one?
4	A No.		4	A We were co-designers.
5	Q Did you submit an RFC for the routing	15:31:51	5	Q Are you able to describe what he 15:35:28
6	information protocol?		6	contributed as opposed to what you contributed?
7	A No.		7	A No. We worked closely together.
8	Q Do you know who did?		8	Q Do you know whether you ever made any
9	A No, I don't know who did.		9	declarations to the IETF concerning copyrights that
10	Q Did you ever ask permission from the	15:32:25	10	Cisco claimed in any of the language in the first 15:35:57
11	person who made up the term "RIP" for permission to		11	BGP RFC?
12	use it, to use that term?		12	MR. NEUKOM: Objection. Vague, compound.
13	MR. NEUKOM: Objection. Foundation,		13	THE WITNESS: To the best of my
14	vague, and calls for a legal conclusion.		14	recollection, we made no copyright claims in the
15	THE WITNESS: There was no one whose	15:32:50	15	first BGP RFC. 15:36:17
16	permission one could ask.		16	BY MR. FERRALL:
17	BY MR. FERRALL:		17	Q Did Cisco make any disclosures to the IETF
18	Q Well, I'll tell you, a Mr. Charles Hedrick		18	regarding copyright claims in any of the BGP RFCs?
19	at Rutgers submitted what I believe to be the first		19	MR. NEUKOM: Objection. Compound, vague.
20	RFC on the routing information protocol.	15:33:05	20	THE WITNESS: Not to my knowledge. 15:36:35
21	Do you know Mr. Hedrick?		21	BY MR. FERRALL:
22	A I do.		22	Q Did you ever make a disclosure to the
23	Q Did you ever ask him for permission to use		23	Internet Architecture Board of any intellectual
24	the term "RIP"?		24	property rights in BGP, to your knowledge?
25	MR. NEUKOM: Objection. Asked and	15:33:15	25	A To my knowledge -- 15:36:57
		Page 126	Page 128	
1	answered. 15:33:15		1	MR. NEUKOM: Objection. Compound, vague. 15:37:00
2	THE WITNESS: Mr. Hedrick formally		2	THE WITNESS: -- we did not make any such
3	documented an informal standard that was already in		3	assertions.
4	use in the industry for a number of years.		4	MR. NEUKOM: And foundation.
5	BY MR. FERRALL: 15:33:27		5	BY MR. FERRALL: 15:37:08
6	Q And what's the significance of that?		6	Q Did you ever have an agreement with
7	MR. NEUKOM: Objection. Calls for		7	Mr. Rekhter about the right to use any of his
8	speculation.		8	contributions to the BGP work that you guys did?
9	THE WITNESS: It wouldn't have occurred to		9	MR. NEUKOM: Vague, compound, calls for a
10	me to ask him for permission. 15:33:47		10	legal conclusion -- 15:37:44
11	BY MR. FERRALL:		11	THE WITNESS: Could you --
12	Q I think you testified earlier that you		12	MR. NEUKOM: -- and mischaracterizes prior
13	submitted several RFCs for the border gateway		13	testimony.
14	protocol, correct?		14	THE WITNESS: Could you repeat the
15	A Correct. 15:34:07		15	question, please? 15:37:59
16	Q And your co-author on at least the first		16	BY MR. FERRALL:
17	such RFC was a Mr. Yakov Rekhter, correct?		17	Q Sure. I'll ask a slightly different
18	A Correct.		18	question.
19	Q Was he your co-author on the subsequent		19	Did you ever ask permission from
20	submissions, too, do you know? 15:34:31		20	Mr. Rekhter to use any of his contributions to the 15:38:09
21	A Certainly on the second one. I don't		21	BGP project?
22	recall on the third one. And after that, there were		22	MR. NEUKOM: Objection. Vague, compound,
23	other co-authors.		23	calls for a legal conclusion.
24	Q And where does Mr. Rekhter or did		24	THE WITNESS: We did not seek permission
25	Mr. Rekhter work at the time? 15:34:50		25	from one another for our individual contributions. 15:38:26

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1 BY MR. FERRALL:	15:38:30		1 MR. NEUKOM: Objection. Vague and asked	15:42:59	
2 Q Okay. IBM didn't ask you for permission,			2 and answered.		
3 either, correct?			3 THE WITNESS: I suppose I had. When one		
4 A No.			4 is talking about different networking protocols, one		
5 Q One of the CLI terms in this case is the	15:39:20		5 needs to clarify which networking protocol one is	15:43:10	
6 term "IP address."			6 talking about. So it was probably terminology that		
7 Are you familiar with that?			7 was in the air.		
8 A I'm familiar with the command expression			8 BY MR. FERRALL:		
9 "IP address."			9 Q Does the same go for "IP host," also? You		
10 Q Did you come up with the phrase "IP	15:39:33		10 had heard that before you joined Cisco?	15:43:29	
11 address"?			11 MR. NEUKOM: Objection. Misstates prior		
12 A When Cisco came out of Stanford, we were			12 testimony.		
13 shipping an IP -- an Internet protocol only router.			13 THE WITNESS: The original form of the		
14 And there was a command "address" that took some			14 "host" command was just "host command." It was		
15 arguments.	15:40:12		15 another one that had to distinguish, in a	15:43:41	
16 And after -- after a while, we started			16 multi-protocol world, in a multi-protocol piece of		
17 adding other protocols to the software. The first			17 software, what you were talking about.		
18 one was "DECnet." And since "address" was already			18 It would have looked very odd in a		
19 taken to refer to IP functionality, Internet			19 multi-protocol router that there was one protocol		
20 protocol functionality, we came up with "DECnet	15:40:44		20 that wasn't prefaced by a -- some descriptive	15:44:03	
21 address," and then had a DECnet address after it.			21 keyword.		
22 That "DECnet address" command could have			22 BY MR. FERRALL:		
23 very well have said "address," and then DECnet			23 Q Following up on that, the purpose of your		
24 addresses look different than IP addresses, and we			24 use of "IP" as the first keyword in that command "IP		
25 could have had the software figure out which type of	15:41:11		25 host" was to distinguish the protocol that it's	15:44:33	
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1 address we were referring to. But we chose "DECnet	15:41:13		1 referring to?	15:44:36	
2 address."			2 A That was the aesthetic choice I made.		
3 It became clear that much more -- that we			3 MR. NEUKOM: Objection. Mischaracterizes		
4 were becoming a multi-protocol router. We were			4 prior testimony.		
5 adding other protocols into the box, into the	15:41:27		5 THE WITNESS: There were many possible	15:44:49	
6 software.			6 ways of doing it. As I indicated, I could perhaps		
7 And I had -- I value -- I value the			7 take a look at an address and then infer what it		
8 aesthetic of having a symmetric-looking command line			8 was. But that was not the choice that I made at the		
9 expression, symmetric hierarchy. It was clear we			9 time.		
10 were heading towards a hierarchy.	15:41:52		10 BY MR. FERRALL:	15:45:07	
11 So at some point after DECnet and perhaps			11 Q What were the alternative commands that		
12 a few other protocols to make things look very			12 you considered for "IP host"?		
13 similar, we started prefacing our IP-only commands			13 A "Name." "Name" was certainly one of the		
14 with "IP." And that gave a very -- what I thought			14 possible candidates. "Network system" or		
15 was a very elegant, symmetric, elegant way of	15:42:16		15 "system" -- there are many, many words that one	15:45:51	
16 referring to different protocols within a			16 could use to refer to all sorts of different things.		
17 multi-protocol router.			17 Q Okay. But now you're talking about		
18 So that is the history of the "IP address"			18 alternatives for the word "host," right?		
19 command.			19 A Um-hum.		
20 Q Okay. My question was simpler. I	15:42:36		20 Q Okay. You didn't -- you're not the first	15:46:08	
21 appreciate that answer. But my question was a			21 one to use the word "host," are you?		
22 little simpler than that, but let me ask it a			22 A No.		
23 different way.			23 Q I mean, "host" had been used for -- well		
24 You had heard of the term "IP address"			24 before you joined Cisco to refer to a computer host.		
25 before you joined Cisco, hadn't you?	15:42:51		25 It's a conventional term, right?	15:46:29	

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1 BY MR. FERRALL:	16:08:17		1 A I don't remember the exact details, but it	16:13:52	
2 Q Okay. Do you have any other recollection			2 is -- either assigns an access list to an interface		
3 as to who actually received the software from			3 or -- I think it assigns an interface to a -- an		
4 Mr. Hedrick?			4 access list to an interface. I believe it's access		
5 A No.	16:08:22		5 class or something like that that assigns it to an	16:14:07	
6 Q Tell me how -- strike that.			6 interface or to a line number.		
7 Do you believe that you created the			7 Q The term "domain name" is not a term that		
8 command "IP access list"?			8 you made up, is it?		
9 MR. NEUKOM: Objection. Vague.			9 A No, I didn't make -- I -- no, I did not.		
10 THE WITNESS: I -- yes.	16:10:20		10 Q "Domain name" is a term that goes back to	16:15:38	
11 BY MR. FERRALL:			11 the ARPANET, actually. Are you aware of that?		
12 Q What functionality does that implement?			12 MR. NEUKOM: Objection. Foundation.		
13 A It -- the "access list" command, which I			13 THE WITNESS: I would be unsurprised if it		
14 implemented at Stanford, the original form at		16:10:51	14 went back that far.		
15 Stanford was a sequence of addresses and subnet			15 Are you referring to ARPANET protocols or	16:16:02	
16 masks or -- in a mask, not a subnet mask but a mask,			16 ARPANET network?		
17 saying which bits to ignore in the address.			17 BY MR. FERRALL:		
18 And you provide a list of these items and			18 Q The ARPANET network.		
19 give it a number. I chose -- I chose 1, 2, 3, 4, up			19 A I believe the concept was introduced while		
20 to 99, or something like that.	16:11:35		20 the ARPANET network was still running.	16:16:15	
21 And then if you assigned it to a terminal			21 Q What about the words "domain lookup"? Did		
22 line, it could restrict what computers -- what			22 you coin that term "domain lookup"?		
23 addresses somebody could connect to from that			23 MR. NEUKOM: Objection. Vague.		
24 particular terminal line.			24 THE WITNESS: It's a parallel construction		
25 You could also assign it to a network	16:11:59		25 to terms like "address lookup" or "host lookup" or	16:16:52	
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1 interface, and it would -- as a packet that was	16:12:12		1 the like, or "database lookup" or...	16:16:59	
2 being sent -- sent out that interface, it could			2 BY MR. FERRALL:		
3 either be permitted or denied going through that			3 Q Did you coin the term "domain lookup"?		
4 interface.			4 A I decided to use that as a command		
5 Those were the two original uses of the	16:12:29		5 expression within the software, yes.	16:17:21	
6 "access list" command expression.			6 Q I'll ask the question one more time. I'm		
7 Q Do you believe that you coined the term			7 asking you if you coined the term "domain lookup."		
8 "access list"?			8 MR. NEUKOM: Objection. Asked and		
9 A It was my choice to use that description.			9 answered and vague.		
10 Q Well, I'm asking you if you coined that	16:12:56		10 THE WITNESS: I did not.	16:17:43	
11 term, or had you ever heard that term before in the			11 BY MR. FERRALL:		
12 context of networking?			12 Q Do you know who did?		
13 MR. NEUKOM: Objection. Vague, compound,			13 A No idea.		
14 asked and answered.			14 Q When was -- to your knowledge, when was		
15 THE WITNESS: I do not believe that I had	16:13:13		15 the term "routing" ever used in conjunction with the	16:18:41	
16 heard the term before.			16 Internet protocol?		
17 BY MR. FERRALL:			17 MR. NEUKOM: Objection. Vague and		
18 Q Had you heard the term "IP access group"			18 foundation.		
19 before?			19 THE WITNESS: I don't know when the term		
20 A Yes.	16:13:25		20 "routing" was used.	16:19:05	
21 Q Who coined that term, to your knowledge,			21 BY MR. FERRALL:		
22 do you know?			22 Q Were people in the field talking about		
23 A I did.			23 routing in connection with IP before you joined		
24 Q Under what circumstances? Or for what			24 Cisco?		
25 purpose, I should say?	16:13:39		25 MR. NEUKOM: Objection. Vague, compound.	16:19:24	

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1	allowing for implementing new functionality in a --	16:29:49	1	BY MR. FERRALL:	16:34:00
2	what you said -- in a logical, correct place?		2	Q Are you aware of any other CLI command	
3	A That is the benefit.		3	sets that are arranged hierarchically?	
4	MR. NEUKOM: Objection. Asked and		4	A No, I'm not.	
5	answered.	16:30:09	5	Q Were you aware of any -- prior to your --	16:34:16
6	BY MR. FERRALL:		6	strike that.	
7	Q Are there any other benefits to the		7	Prior to your joining Cisco, were you	
8	framework for the hierarchy?		8	aware of any operating systems that used multi-word	
9	MR. NEUKOM: Objection. Vague.		9	commands?	
10	THE WITNESS: We believed that it would	16:30:29	10	MR. NEUKOM: Objection. Vague.	16:34:39
11	make it easier -- we believed that the customers		11	THE WITNESS: I was not aware of any	
12	would like it.		12	router or switch products that had such things.	
13	BY MR. FERRALL:		13	BY MR. FERRALL:	
14	Q Why is that?		14	Q Well, were you aware of any operating	
15	A Customers always like products that look	16:30:52	15	systems that used multi-word commands?	16:34:53
16	like they were built by one company.		16	MR. NEUKOM: Objection. Asked and	
17	Q How would your hierarchy contribute to		17	answered.	
18	that?		18	THE WITNESS: Yes.	
19	MR. NEUKOM: Objection. Foundation, calls		19	BY MR. FERRALL:	
20	for speculation and vague.	16:31:06	20	Q What examples were you aware of?	16:35:04
21	THE WITNESS: I'm sorry. What was your		21	A Of operating systems that had multi-word	
22	question?		22	commands? I was most familiar with UNIX and	
23	BY MR. FERRALL:		23	TOPS-20.	
24	Q How does the framework for the hierarchy		24	Q Any others?	
25	that you described allow customers to feel like the	16:31:22	25	A I had the vague impression that VMS had	16:35:27
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1	product was built by one company, to use your words?	16:31:31	1	such things.	16:35:35
2	A Well, that was the belief of the		2	Q Prior to your joining Cisco, were you	
3	engineers.		3	aware of any operating systems that had two or more	
4	Q I'm asking you to explain why you believe		4	commands that began with the same first word?	
5	that.	16:31:52	5	MR. NEUKOM: Objection. Vague.	16:36:02
6	A It's an opinion of mine. I have no -- did		6	THE WITNESS: Two or more commands that	
7	not have evidence for it at the time.		7	began with the same word. I can't recall any.	
8	Q What is the alternative or alternatives to		8	MR. FERRALL: Let's mark this as the next	
9	the framework for the hierarchy you described?		9	exhibit.	
10	MR. NEUKOM: Objection. Vague and	16:32:33	10	(Exhibit 39 was marked for identification	16:48:10
11	compound, calls for speculation.		11	and is attached hereto.)	
12	THE WITNESS: So I don't have experience		12	BY MR. FERRALL:	
13	with other vendors' interfaces for routers and		13	Q Exhibit 39 is a document entitled "Cisco's	
14	networking devices. I have only had descriptions		14	Response to Arista's Interrogatory No. 16 amended	
15	from others of styles of interfaces.	16:33:01	15	Exhibit D-1 (IOS Release 11.0)." 16:37:09	
16	We had a competitor named Wellfleet that		16	And I assume, Mr. Lougheed, that you	
17	attempted to introduce a user interface that, as it		17	haven't seen the cover page, but tell me if you've	
18	was described to me, was typing in ASN.1 notation as		18	seen any of the inside to Exhibit 39.	
19	defined in the SNMP protocol for retrieving and		19	A I've not seen the inside of this.	
20	setting information.	16:33:27	20	Q You've never seen these images?	16:37:35
21	An ASN.1 notation is numbers and --		21	A I don't recall having seen them before.	
22	numbers and decimal points.		22	Q Okay. So if you look at -- if you go a	
23	My understanding is that it was not		23	couple of pages in, let's just take an example of	
24	popular with customers. But it was a way of		24	the "clear" command set --	
25	managing a system.	16:33:52	25	A I'd like to page through the rest of this	16:38:14

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1	This is the leading part of a command. There's more to it than this.	16:47:45	1	And we'll take a break after the witness answers this question.	16:51:47
3	MR. NEUKOM: Brian, I think at this point we're coming up on an hour and a half. Do you mind if we take a short break?	16:48:05	3	THE WITNESS: I've answered the question to the best of my ability.	
6	MR. FERRALL: Well, let me just ask one more question.		5	BY MR. FERRALL: 16:52:03	
8	Q If you go back to the "clear" example on page 5, am I right that your conception of a hierarchy for this command would still be implemented even if the "clear" keyword command were changed to something else like "white"? Is that right?	16:48:38	6	Q Well, I'm entitled to an answer to this one, not a reference to some past answer. So listen to the question.	
14	MR. NEUKOM: Objection. Vague, compound, hypothetical, calls for opinion testimony.	16:49:04	9	Can you tell me, if I used a different keyword instead of "clear" on page 5 of Exhibit 39, would I still be using your concept of a hierarchy?	16:52:14
16	THE WITNESS: Are you asking if I could have chosen another word besides "clear"?		12	MR. NEUKOM: Same objections.	
18	BY MR. FERRALL:		13	And we're about five questions beyond the one question you asked for before a break.	
19	Q No. I'm asking if you're -- another way of asking it is does the concept of your hierarchy depend upon the selection of the first word, or is it independent of that?	16:49:18	15	THE WITNESS: There is -- there's the abstract concept of a hierarchy, and I -- I basically don't understand what you're getting at.	16:52:46
23	MR. NEUKOM: Objection. Vague, calls for speculation and opinion testimony.		18	I've answered the question to the best of my ability.	
25	THE WITNESS: There is a limited set of	16:49:48	20	MR. FERRALL: Okay. All right. Let's go off the record.	16:53:22
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1	what we could call perhaps top-level keywords, and -- that refer to configurable entities in the software, in the system, that are often analogous.	16:49:49	1	The time is 5:13 p.m. 17:13:27	
4	And when you have a situation like that, developing a hierarchy is a way of managing complex entities that have many similarities and a few differences.	16:50:18	2	(Exhibit 40 was marked for identification and is attached hereto.)	
8	BY MR. FERRALL:		4	BY MR. FERRALL:	
9	Q I'm sorry. I've got to ask the question again. If you can't answer it, tell me you can't answer it. But here's my question:	16:50:46	5	Q Okay. We just marked as Exhibit 40 an email bearing control numbers CSI-CLI-00746398. It appears to be between you and a Craig Fox, among others.	17:13:32
12	In this example on page 5 of Exhibit 39, does your concept of the hierarchy depicted here depend upon the choice of the first keyword?		9	And I guess my only question for you, Mr. Lougheed, is do you have any reason to believe that you didn't send this email that's Exhibit 40?	17:13:57
15	MR. NEUKOM: Objection. Mischaracterizes the document and the witness's prior testimony, vague, and calls for speculation and asked and answered.	16:51:08	12	A It looks like I sent it. I have not had a chance to read it.	
19	THE WITNESS: I do not believe I can improve on my answer at this point.	16:51:20	14	Q Are you on the Parser Police mailing list?	
21	BY MR. FERRALL:		15	MR. NEUKOM: Objection. Vague. 17:14:36	
22	Q Okay. So you couldn't tell me -- if I used a different first keyword, could you tell me whether I'm using your hierarchy idea or not?		16	THE WITNESS: At one point I was.	
25	MR. NEUKOM: Same objections.	16:51:38	17	BY MR. FERRALL:	
			18	Q For what period of time were you on that mailing list?	
			20	A I don't -- I don't remember a time period, but it has been many years since I have been on that mailing list.	17:14:56
			22	Q Are you on the Fellows mailing list?	
			23	MR. NEUKOM: Objection. Vague.	
			24	THE WITNESS: I'm on -- I've been on	17:15:32

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1	MR. FERRALL: Why don't we go off the record and get a time check.	17:45:36
2	THE VIDEO OPERATOR: Going off the record, the time is 5:45 p m.	
3	(Recess, 5:45 p m. - 5:46 p.m.)	17:45:41
4	THE VIDEO OPERATOR: Back on the record, the time is 5:46 p m.	
5	MR. NEUKOM: So back on the record. I think we're all in agreement and the videographer has confirmed that there are 26 minutes left.	17:46:06
6	MR. FERRALL: Right.	
7	Q So you have a set of commands that begin with the keyword "clear," right?	
8	A Um-hum.	
9	MR. NEUKOM: I think he needs a "yes" or a "no."	17:46:36
10	THE WITNESS: Yes, the Cisco command line interface has a hierarchy of command expressions that begin with the keyword "clear."	
11	BY MR. FERRALL:	17:46:55
12	Q Were you aware of any operating system that used the word "clear" as a command before you joined Cisco?	
13	MR. NEUKOM: Objection. Vague.	
14	THE WITNESS: I believe there is a UNIX	17:47:21
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
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1	command "clear" that blanks a screen. I'm not aware of any operating system that uses "clear" in the sense that the Cisco CLI uses "clear."	17:47:22
2		
3		
4	BY MR. FERRALL:	
5	Q Tell me about the creative process that went into your selection of the word "clear" as the first keyword in these commands.	17:47:57
6		
7		
8	MR. NEUKOM: Objection. Vague and compound.	
9		
10	THE WITNESS: I needed some way of resetting or clearing data structures in the box, something that's very useful in the debugging of -- that sort of action is very useful in debugging software, correcting problems in a running system and the like.	17:48:19
11		
12		
13		
14		
15		
16	And "reset" or "clear" or "zero" or "restart" certainly could have been possibilities.	
17		
18	It was a very generically simple example. It was another sort of generic activity of I wanted to clear or reset some data structures. And that one -- I don't recall, but I suspect that one seemed reasonable and came to mind.	17:49:20
19		
20		
21		
22		
23	BY MR. FERRALL:	
24	Q Do you recall why you selected the word "clear"?	17:49:47
25		
1	A It seemed -- it seemed aesthetically pleasing to me. It was something that was descriptive of an action that I wanted to take that was a fairly generic action, a fairly common action.	17:49:52
2		
3		
4		
5	Q What does "banner MOTD" mean?	17:50:47
6	A MOTD is message of the day.	
7	Q Did you make up that acronym?	
8	A No, I did not.	
9	Q Who did?	
10	A I don't know.	17:51:07
11	Q Did you coin the term "banner" as an operating system command?	
12	MR. NEUKOM: Objection. Vague.	
13	THE WITNESS: I simply implemented the command.	17:51:37
14	BY MR. FERRALL:	
15	Q Are you aware of operating systems in existence before you joined Cisco that used the command "banner"?	
16	A I don't recall any at this point.	17:51:52
17	Q When did you come up with the command "banner MOTD"?	
18	A The command that came first was just "banner," and its function was to print a vacant terminal message on a terminal and to apply some	17:52:26

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1 system, didn't you?	17:53:57		1 A Yes.	17:56:58	
2 MR. NEUKOM: Objection. Asked and			2 Q Okay.		
3 answered.			3 A I remember you asked questions about that.		
4 THE WITNESS: I have no memory of			4 Q Are you familiar with there being a		
5 borrowing it.	17:54:05		5 provision for time-outs in the ARP protocol?	17:57:15	
6 BY MR. FERRALL:			6 MR. NEUKOM: Objection. Vague and		
7 Q Okay. Do you have a memory of the			7 compound.		
8 creative process whereby you decided on "banner" as			8 THE WITNESS: There is the -- ARP entries		
9 a command?			9 can become stale. If you unplug the computer or you		
10 A I don't remember the details.	17:54:21		10 move the computer somewhere else or you replace the	17:57:43	
11 (Exhibit 42 was marked for identification			11 network interface, entries will become stale.		
12 and is attached hereto.)			12 Implementing a time-out is a way of making sure the		
13 BY MR. FERRALL:			13 cache isn't stale.		
14 Q We've marked as Exhibit 42 another excerpt			14 BY MR. FERRALL:		
15 of code that we've reformatted. It bears control	17:54:43		15 Q Are you aware of there being a provision	17:58:10	
16 numbers CSI-CLI-01108326.			16 for time-outs in the RFC for ARP?		
17 MR. NEUKOM: Counsel, I take it this is a			17 MR. NEUKOM: Objection. Vague and		
18 printout of a file or a document that was produced			18 compound, asked and answered.		
19 with an AEO designation.			19 THE WITNESS: I'm not -- I don't remember		
20 MR. FERRALL: Right.	17:55:02		20 such language right now.	17:58:38	
21 MR. NEUKOM: Okay. So we're going to mark			21 BY MR. FERRALL:		
22 the witness's copy and we'll ask that all copies in			22 Q Did you create the term "distance BGP"?		
23 the room be marked by hand with the phrase "Highly			23 A Yes.		
24 Confidential - AEO."			24 Q How did you come up with that term?		
25 ///	17:55:10		25 A The Cisco IOS started supporting multiple	17:59:11	
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1 BY MR. FERRALL:	17:55:19		1 interior routing protocols. And customer networks,	17:59:19	
2 Q Mr. Lougheed, this is a document that			2 especially in the early days when they were attached		
3 appears to be your work, according to the copyright			3 to the -- they had campus networks running one		
4 notice on the front.			4 routing protocol, they'd be attached to the NSFNET		
5 Do you see that?	17:55:29		5 backbone as well running a different routing	17:59:39	
6 A Yes, I see that.			6 protocol.		
7 Q Okay. Do you know when -- do you			7 And since routing protocols would give		
8 recognize it?			8 incommensurate metrics, metrics that could not be		
9 A Yes, I do.			9 compared, I developed a concept of distance that		
10 Q What is it?	17:55:36		10 says if one routing protocol says it knows a route	18:00:08	
11 [REDACTED]			11 to one destination and another routing protocol says		
12 [REDACTED]			12 it knows a route to that same destination, which --		
13 [REDACTED]			13 the routing protocol with the smallest		
14 Q And when did you compose what's			14 administrative distance would be the one that would		
15 Exhibit 42?	17:56:02		15 be entered into the routing table.	18:00:24	
16 A Is there a question?			16 And so that was the problem, and my		
17 Q Yes. I asked when did you compose			17 solution was the administrative distance mechanism		
18 Exhibit 42?			18 that I described.		
19 A Apparently June of 1985.			19 And when I implemented BGP, that was a		
20 Q And you were employed by Stanford at that	17:56:28		20 natural extension to include for BGP as well to be	18:00:49	
21 time, right?			21 able to configure an administrative distance to		
22 A Correct.			22 determine the believability of BGP.		
23 Q We had talked earlier about the ARP,			23 If no routing protocol -- if only one		
24 address resolution protocol.			24 routing protocol knew the destination, you would		
25 Do you remember that?	17:56:57		25 believe that. If there are two or more,	18:01:10	

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1	administrative distance was the tie-breaker.	18:01:16	1	A When Cisco announced the -- actually, it
2	Q Sorry. I'm going to jump back to ARP.		2	18:06:22 was in the Mercury News in the morning, and then
3	There's a term you use associated with		3	later through internal email at Cisco.
4	ARP, "ARP cache." We talked about that earlier in		4	Q When the suit was filed?
5	looking at one of the "clear" commands, right?	18:01:52	5	A When the suit was filed. 18:06:38
6	Where did the term "ARP cache" come from?		6	Q Okay. Not before?
7	A The cache is a -- logically a list of		7	A Not before.
8	items. An ARP cache would be a list of ARP requests		8	Q Did you have any involvement in the
9	that have been satisfied, including their MAC		9	litigation between Cisco and Huawei?
10	addresses and how long since the last time we'd seen	18:02:37	10	MR. NEUKOM: That's a "yes" or "no" due to
11	a -- the router had seen an ARP request go by for		11	18:06:49 privilege concerns.
12	that particular source address.		12	THE WITNESS: No, I was not involved with
13	That sort of computer science concept of a		13	Huawei.
14	cache is found all over.		14	BY MR. FERRALL:
15	Q One of the commands that is indicated that	18:03:14	15	Q Are you able to -- sorry. Strike that. 18:07:26
16	you authored is the command "boot system."		16	Were you involved at all in composing any
17	Had you ever heard someone use the words		17	18:08:07 of the commands that begin with "AAA"?
18	"boot system" together before you joined Cisco?		18	A No.
19	MR. NEUKOM: Objection. Vague.		19	Q Can you tell me how the "clock set"
20	THE WITNESS: I had heard phrases like	18:03:45	20	command was composed? 18:08:07
21	"boot the system up," "reboot the system," "reload		21	A No, I cannot. I wasn't involved.
22	the system," "start the system," "restart the		22	Q Can you tell me how any of the IPv6
23	system."		23	commands were composed?
24	(Exhibit 43 was marked for identification		24	A Yes.
25	and is attached hereto.)	16:48:10	25	Q Which ones? 18:08:30
		Page 182	Page 184	
1	BY MR. FERRALL:	18:04:06	1	A IPv6 address. IPv6 route. 18:08:37
2	Q We've marked as Exhibit 43 a document		2	Q What was your role in composing IPv6
3	entitled "DECrouter 90 Products Configuration and		3	address?
4	Reference Volume 2." It bears control numbers		4	A I was creating a prototype IPv6
5	CSI-ANI-00081683 to 81683.000344.	18:04:25	5	implementation. 18:09:03
6	Have you ever seen Exhibit 43 before?		6	Q Did you come up with that command, "IPv6
7	A No.		7	address"?
8	Q According to the metadata of this		8	A Yes.
9	document, you are the custodian.		9	Q When did you do that?
10	Do you have any idea why that's the case?	18:05:03	10	A I believe it was 1996. 18:09:21
11	A No, I don't. I haven't seen it before.		11	Q Did you work with anyone else on that?
12	Q Let me turn to another question.		12	A Yes.
13	Were you -- have you ever tracked the		13	Q Who?
14	extent to which other companies have used Cisco CLI		14	A Dino Farinacci and Rand Atkinson, and
15	commands?	18:05:45	15	later Pedro Marquez. 18:09:42
16	A No, I have not.		16	Q The other one you said was IPv6 route?
17	Q Are you aware of other companies using		17	A That may have been Dino.
18	Cisco CLI commands?		18	MR. FERRALL: Let me go off the record for
19	A I'm aware of Arista using Cisco CLI		19	18:10:11 a second.
20	commands.	18:06:07	20	THE VIDEO OPERATOR: Going off the record,
21	Q Are you aware of any other company using		21	the time is 6:10 p.m.
22	Cisco CLI commands?		22	(Recess, 6:10 p.m. - 6:11 p.m.)
23	A No, I'm not.		23	THE VIDEO OPERATOR: Back on the record.
24	Q When did you first become aware of Arista		24	The time is 6:11 p.m.
25	using Cisco CLI commands?	18:06:16	25	18:11:34

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1	BY MR. FERRALL:	18:11:36	1	Mr. Tjong. If you're okay with it, I'd like to just	18:14:53
2	Q Did you compose the command "timers basic		2	do a stipulation across the case that both sides	
3	RIP"?		3	have the 30-day review and errata right for all	
4	A I believe I did.		4	transcripts regardless whether counsel puts it on	
5	Q Prior to your joining Cisco, are you	18:11:55	5	the record at the depo as a two-way street.	18:15:04
6	familiar with any commands that use the word		6	MR. FERRALL: That's fine. I thought it	
7	"timers"?		7	existed as a matter of procedure anyway. So that's	
8	MR. NEUKOM: Objection. Vague.		8	fine.	
9	THE WITNESS: No, I was not aware of any		9	MR. NEUKOM: I hope you're right, but glad	
10	operating system, general purpose or network	18:12:13	10	to have the stipulation, even if it's unnecessary.	18:15:17
11	specific, that used -- had a "timers" command.		11	MR. FERRALL: Okay.	
12	BY MR. FERRALL:		12	MR. NEUKOM: Thanks very much.	
13	Q How did you come up with the command		13	THE VIDEO OPERATOR: This concludes	
14	"timers basic RIP"? Describe that creative process		14	today's videotaped deposition of Mr. Kirk Lougheed.	
15	for me.	18:12:30	15	We're off the record at 6:15 p m. Thank you.	18:15:25
16	A There developed a need or a desire to		16	(TIME NOTED: 6:15 p m.)	
17	change some of the fundamental timing constants		17	--oo--	
18	of -- I think first was the IGRP routing protocol,		18		
19	and I implemented a command that allowed those		19		
20	timers to be user-configured.	18:12:59	20		
21	And later on I or someone else extended		21		
22	that to the RIP timers so customers could speed up		22		
23	or slow down the pulse of routing updates.		23		
24	Q And when did that occur?		24		
25	A 1988 or 1989.	18:13:36	25		
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1	Q How did you choose the term -- the words	18:13:39	1		
2	"timers basic" for this function?		2		
3	A I don't remember where "basic" came from.		3		
4	But using the keyword "timers" was my -- was my		4		
5	introduction, was my creation.	18:14:00	5		
6	MR. NEUKOM: Counsel, I believe we're now		6		
7	beyond seven hours.		7		
8	MR. FERRALL: Okay. Well, I -- given		8	I, KIRK LOUGHEED, do hereby declare under	
9	Mr. Lougheed's tenure at Cisco, I thank him for his		9	penalty of perjury that I have read the foregoing	
10	time, but I will say I think we deserve some more	18:14:22	10	transcript; that I have made any corrections as	
11	time with him.		11	appear noted, in ink, initialed by me, or attached	
12	But I understand seven hours is up and		12	hereto; that my testimony as contained herein, as	
13	you're going to say enough is enough for today I		13	corrected, is true and correct.	
14	take it; is that right?		14	EXECUTED this _____ day of _____,	
15	MR. NEUKOM: Certainly for today for the	18:14:31	15	2015, at _____, _____	
16	sake of the witness. And we will respectfully		16	(City) (State)	
17	disagree with the idea that counsel needs more than		17		
18	seven hours --		18		
19	MR. FERRALL: Okay.		19		
20	MR. NEUKOM: -- needs more than today.	18:14:41	20	KIRK LOUGHEED	
21	But we can discuss that for another day.		21		
22	In the meantime, I should note for the		22		
23	record the witness reserves the right to review the		23		
24	transcript and make corrections.		24		
25	Brian, I'm not sure I did that for	18:14:51	25		

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1 I, the undersigned, a Certified Shorthand
2 Reporter of the State of California, do hereby
3 certify:

4 That the foregoing proceedings were taken
5 before me at the time and place herein set forth;
6 that any witnesses in the foregoing proceedings,
7 prior to testifying, were administered an oath; that
8 a record of the proceedings was made by me using
9 machine shorthand which was thereafter transcribed
10 under my direction; that the foregoing transcript is
11 a true record of the testimony given.

12 Further, that if the foregoing pertains to
13 the original transcript of a deposition in a Federal
14 Case, before completion of the proceedings, review
15 of the transcript [X] was [] was not requested.

16 I further certify I am neither financially
17 interested in the action nor a relative or employee
18 of any attorney or any party to this action.

19 IN WITNESS WHEREOF, I have this date
20 subscribed my name.

21

22 Dated: 11/25/2015

23

24 <%signature%>
25 CARLA SOARES